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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/027,775	12/20/2001	Yukihisa Takeuchi	791 126 C1P2B	1603
25191	7590	12/15/2003	EXAMINER KNAUSS, SCOTT A	
BURR & BROWN PO BOX 7068 SYRACUSE, NY 13261-7068			ART UNIT PAPER NUMBER	

2874

DATE MAILED: 12/15/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/027,775	TAKEUCHI ET AL.	
	Examiner	Art Unit	
	Scott A Knauss	2874	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 48-94 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 48-58, 61-91 and 94 is/are rejected.
- 7) ☒ Claim(s) 49, 59, 60, 82, 92 and 93 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☒ Certified copies of the priority documents have been received in Application No. 09/799329.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
- a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) ____ | 6) <input type="checkbox"/> Other: ____ |

DETAILED ACTION

Claim Objections

1. Claims 49 and 82 are objected to because of the following informalities: Claims 49 and 82 recite the limitation "based on needs" in line 13 of each of the claims. The examiner considers this to be unclear, because it is not clear whether or not the material preceeding "based on needs" is being positively claimed. Appropriate correction is required.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 48,52,53,56-58,61,62,64-69,73-78 and 87-91 are rejected under 35 U.S.C. 102(e) as being anticipated by US 6,529,655 (Jurbergs).

Regarding claim 48, Jurbergs discloses an optical switch in figs. 1a and 1b comprising at least a light transmission portion (#14,#16,#18), an optical path-changing portion #22 and an actuator portion #24;
wherein:

the light transmission portion has a light reflecting plane #34 provided on at least one part of a plane facing the optical path-changing portion to totally reflect light, and

light transmission channels (#14,#16,#18) having optical waveguiding bodies and being provided in at least three directions with the light reflecting plane (see also fig. 4, the plane being considered the entire facing surface of material #12) as a starting point (the examiner considers waveguides #16,#18 to be provided in different directions because they have different paths leading to different output points)

the optical path-changing portion #22 is provided in proximity to the light reflecting plane of the light transmission portion in a movable condition and has an optical path-changing member #22 for at least reflecting or scattering light; and

the actuator portion has a mechanism that is displaced by external signals and transmits the displacement to the optical path-changing portion (see fig. 1B);
characterized in that

the switching or dividing of an optical path is carried out by contacting or separating the optical path-changing portion to or from the light reflecting plane of the light transmission portion by displacement of the actuator portion in response to the external signals;

so as to totally reflect an input light from the light transmission channels at the light reflecting plane of the light transmission portion and transmit it to a specific light transmission channel on an output side when the optical path-changing portion is separated from the light reflecting plane of the light transmission portion (fig. 1a);

or take out an input light from the light transmission channel, reflect or scatter it at the optical path-changing portion, and transmit it to a specific one or more light

transmission channels on the output side when the optical path-changing portion is contacted to the light reflecting plane of the light transmission portion (fig. 1b)

Regarding claim 52, the light transmission portion may comprise optical fibers having cores and claddings (see col. 3, lines 22-25) which can be considered two or more layers having different light refractive indexes.

Regarding claim 53 the light transmission channels of the light transmission portion may comprise optical waveguides (see col. lines 10-12)

Regarding claim 56, it is apparent from fig. 1b that the optical path changing portion has a light introduction member made of a transparent material.

Regarding claim 57 the optical path changing portion has a light reflector #38 for specularly reflecting light.

Regarding claim 58 the light reflector for specularly reflecting light is a light reflecting film that is integrally formed on a plane of the light introduction member on the side of the displacement transmission member (see col. 3, lines 57-58).

Regarding claim 61, Jurbergs discloses a multichannel optical switch in figs. 2a-2d provided with a plurality of optical switches each comprising at least a light transmission portion, an optical path-changing portion and an actuator portion; characterized in that

the light transmission portion has a light reflecting plane provided on at least one part of a plane facing the optical path-changing portion to totally reflect light, and light

transmission channels having optical wave guiding bodies and being provided in at least three directions with the light reflecting plane as a starting point;

the optical path-changing portion is provided in proximity to the light reflecting plane of the light transmission portion in a movable condition and has an optical path-changing member for at least reflecting or scattering light; and

the actuator portion has a mechanism that is displaced by external signals and transmits the displacement to the optical path-changing portion; wherein

the switching or dividing of an optical path is carried out by contacting or separating the optical path-changing portion to or from the light reflecting plane of the light transmission portion by displacement of the actuator portion in response to the external signals;

so as to totally reflect an input light from the light transmission channels at the light reflecting plane of the light transmission portion and transmit it to a specific light transmission channel on an output side when the optical path-changing portion is separated from the light reflecting plane of the light transmission portion;

or take out an input light from the light transmission channel, reflect or scatter it at the optical path-changing portion, and transmit it to a specific one or more light transmission channels on the output side when the optical path-changing portion is contacted to the light reflecting plane of the light transmission portion.

Regarding claim 62, each light transmission channel (#14, #16, #18, #50, #52, #54, #56) in a plurality of optical switches is formed of a single light transmission portion.

Regarding claim 64 one input-side channel #14 is linked to one output-side channel #50 in series as for each optical switch; and light that is input from an input end of optical switches, is switched at each optical path-changing portion of a plurality of optical switches.

Regarding claim 65, Jurbergs discloses a plurality of optical switches which are constituted by at least one optical switch having a plurality of input side channels (the switch at the bottom right hand side, having inputs (#16,#18) and at least one optical switch having a plurality of output-side channels (top left switch, channels #16,#18), and one input-side channel is linked to one output-side channel between adjacent optical switches, switching the light input from input ends (#14,#16,#18) of a plurality of optical switches at the optical path changing portion of the plurality of optical switches.

Regarding claim 66, Jurbergs discloses a plurality of optical switches linking one input-side channel #14 to one output-side channel (#50-#56) between adjacent optical switches by means of waveguides (#16,#18), which as stated previously Jurbergs discloses can be optical fibers (see col. 3, lines 20-25), and switching at least the light input from input ends in an optical switch at each optical path-changing portion #22 of a plurality of optical switches.

Regarding claims 67-69, the switches can be considered to be in a row since they are next to each other.

Regarding claims 73-75, Jurbergs discloses that a prism coupled to a lens, which can be considered an optical coupler, may be joined to a light signal output end of the switches according to claims 67-69 (see col. 6, lines 64-67)

Regarding claims 76-78 Jurbergs discloses that an optical device such as a multiplexing device may be joined to a light-signal output end of each light transmission channel in the multichannel optical switches according to Claims 67-69 to branch or collect at least one part of the light transmission channel (see col. 6, lines 58-64.

Regarding claim 87, the light transmission portion may comprise optical fibers having cores and claddings (see col. 3, lines 22-25) which can be considered two or more layers having different light refractive indexes.

Regarding claim 88 the light transmission channels of the light transmission portion may comprise optical waveguides (see col. lines 10-12)

Regarding claim 89, it is apparent from fig. 1b that the optical path changing portion has a light introduction member made of a transparent material.

Regarding claim 90 the optical path changing portion has a light reflector #38 for specularly reflecting light.

Regarding claim 91 the light reflector for specularly reflecting light is a light reflecting film that is integrally formed on a plane of the light introduction member on the side of the displacement transmission member (see col. 3, lines 57-58).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. Claims 55,79-81 and 86 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jurbergs.

Regarding claims 55 and 86, Jurbergs does not disclose a focusing lens or collimator lens is arranged at each of a plurality of light-signal input ends and/or light-signal output ends of the light transmission portions, and light signals being input and output through the focusing lens or the collimator lens.

Nevertheless, the examiner submits that it is well known in the art to use collimating or focusing lenses at the input/output ends of an optical switch. Such lenses enable other optical components to be efficiently coupled to optical switches with low loss. Therefore, the examiner submits that it would have been obvious to one of ordinary skill in the art to use lenses at the input/output ends of the switch of Jurbergs for the purpose of efficiently coupling light into and out of the switch.

Regarding claim 79-81, Jurbergs fails to disclose each output end or each input end of a plurality of the multichannel optical switches according to Claim 64-66 is

linked to a plurality of input ends or output ends in at least another multichannel optical switch.

Nevertheless, the examiner submits that it is well known in the art to cascade optical switches by connecting each output of a switch to an input of another switch. Such a configuration is useful to provide, for example in the case of Jurbergs in fig. 2, a switch capable of switching between up to 16 outputs by connecting four switches of the type disclosed by Jurbergs in fig. 2, to each output waveguide (#50-#56). Therefore, the examiner submits that it would have been obvious to one of ordinary skill in the art to cascade four additional switches onto the outputs of the switch disclosed in fig. 2, for the purpose of switching a single input between a high number of outputs, 16 in this case.

Double Patenting

7. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Omum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

8. Claims 48-58,61-67,70,73,79,82-91 and 94 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-28 of U.S. Patent No. **6,542,658** ('658 patent). Although the conflicting claims are not identical, they are not patentably distinct from each other because of the following.

Regarding claim 48, the 658 patent discloses an optical switch in claim 1 comprising at least a light transmission portion, an optical path-changing portion and an actuator portion wherein:

the light transmission portion has a light reflecting plane provided on at least one part of a plane facing the optical path-changing portion to totally reflect light, and light transmission channels having optical waveguiding bodies and being provided in at least three directions with the light reflecting plane as a starting point .

the optical path-changing portion #22 is provided in proximity to the light reflecting plane of the light transmission portion in a movable condition and has an optical path-changing member (light reflection member #22) for reflecting light; and

the actuator portion has a mechanism that is displaced by external signals and transmits the displacement to the optical path-changing portion (see fig. 1B); characterized in that

the switching or dividing of an optical path is carried out by contacting or separating the optical path-changing portion to or from the light reflecting plane of the

light transmission portion by displacement of the actuator portion in response to the external signals;

so as to totally reflect an input light from the light transmission channels at the light reflecting plane of the light transmission portion and transmit it to a specific light transmission channel on an output side when the optical path-changing portion is separated from the light reflecting plane of the light transmission portion (fig. 1a);

or take out an input light from the light transmission channel, reflect it at the optical path-changing portion, and transmit it to a specific one light transmission channels on the output side when the optical path-changing portion is contacted to the light reflecting plane of the light transmission portion.

Regarding claim 49, the 658 patent discloses in claim 2 all the limitations of claim 49 except for the displacement member. However, since the displacement member is used based on needs (clm. 49, line 13) it can be considered optional, and thus claim 2 anticipates claim 49.

Regarding claim 50-55, claims 3-8 of the patent are substantially identical

Regarding claim 56, claim 1 of the patent discloses the use of a light introduction member of transparent material.

Regarding claim 58, claim 9 discloses the use of the light reflecting film.

Regarding claim 61-67, claims 10-16 discloses all the claimed features of the claims.

Regarding claim 70, the claim limitations are disclosed in claims 13 and 17

Regarding claim 73, the claim limitations are disclosed in claim 18

Regarding claim 79, the claim limitations are disclosed in claim 19

Regarding claim 82, the limitations are disclosed in claim 20 (see discussion regarding claim 49 above)

Regarding claims 83-88, the limitations are disclosed in claims 21-26

Regarding claim 89, the claim limitations are encompassed in claim 10

Regarding claim 91, the claim limitations are disclosed in claim 27

Regarding claim 94, the claim limitations are disclosed in claim 28

Regarding claims 57 and 90, although it is not stated in the claims that the light is specularly reflected, it is well known in the art that when it is desired to reflect light to a specific location, it is desirable to use specular (mirror) reflection, in order to accurately reflect the light to a desired location. Therefore it would have been obvious to one of ordinary skill in the art to provide a specular reflector for the purpose of accurately reflecting the light.

9. Claims 48-58,61-91 and 94 are also provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-38 of copending Application No. **10/027,773** (the 773 application) Although the conflicting claims are not identical, they are not patentably distinct from each other because of the following:

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Regarding claim 48, the 773 application discloses an optical switch in claim 1 comprising at least a light transmission portion, an optical path-changing portion and an actuator portion wherein:

the light transmission portion has a light reflecting plane provided on at least one part of a plane facing the optical path-changing portion to totally reflect light, and light transmission channels having optical waveguiding bodies and being provided in at least three directions with the light reflecting plane as a starting point .

the optical path-changing portion #22 is provided in proximity to the light reflecting plane of the light transmission portion in a movable condition and has an optical path-changing member (light reflection member #22) for reflecting light; and

the actuator portion has a mechanism that is displaced by external signals and transmits the displacement to the optical path-changing portion (see fig. 1B); characterized in that

the switching or dividing of an optical path is carried out by contacting or separating the optical path-changing portion to or from the light reflecting plane of the light transmission portion by displacement of the actuator portion in response to the external signals;

so as to totally reflect an input light from the light transmission channels at the light reflecting plane of the light transmission portion and transmit it to a specific light transmission channel on an output side when the optical path-changing portion is separated from the light reflecting plane of the light transmission portion (fig. 1a);

or take out an input light from the light transmission channel, reflect it at the optical path-changing portion, and transmit it to a specific one light transmission channels on the output side when the optical path-changing portion is contacted to the light reflecting plane of the light transmission portion.

Regarding claim 49, the 658 patent discloses in claim 2 all the limitations of claim 49 except for the displacement member. However, since the displacement member is used based on needs (clm. 49, line 13) it can be considered optional, and thus claim 2 anticipates claim 49.

Regarding claim 50-55, claims 3-8 are substantially identical

Regarding claim 56, claim 1 of the patent discloses the use of a light introduction member of transparent material.

Regarding claim 58, claim 9 discloses the use of the light reflecting film.

Regarding claim 61-88, claims 10-37 of the application disclose all the claimed features of the claims.

Regarding claim 89, the transparent member is disclosed in claim 10

Regarding claim 91, claim 38 discloses the claimed limitations.

Regarding claim 94, claim 39 discloses the claimed limitations

Regarding claims 57 and 90, although it is not stated in the claims that the light is specularly reflected, it is well known in the art that when it is desired to reflect light to a specific location, it is desirable to use specular (mirror) reflection, in order to accurately reflect the light to a desired location. Therefore it would have been obvious to one of

ordinary skill in the art to provide a specular reflector for the purpose of accurately reflecting the light.

Allowable Subject Matter

10. Claims 49-51,54,59,60,63,70-72,82-85,and 92-94 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims, and if all double patenting issues as set forth above are overcome.

Regarding claims 49 and 82, as well as dependent claims 50,51,83 and 84, prior art fails to teach or suggest a switch as set forth in claims 48 and 61 having an actuator comprising a piezoelectric/electrostrictive element comprising a piezoelectric/electrostrictive layer, at least one pair of electrodes arranged on one part of the piezoelectric/electrostrictive layer; and a vibrating member that is in contact with at least one part of the piezoelectric/electrostrictive element to support the piezoelectric/electrostrictive element and that converts strain of the piezoelectric/electrostrictive layer into bending displacement or vibrations; a fixing member, and a displacement transmission member.

Regarding claims 54 and 85, prior art fails to disclose a switch as set forth in claim 48 and 61 respectively wherein the light transmission portion is configured by joining at least two optical wave guiding bodies to one optical waveguiding body so as to form light transmission channels into at least three directions, with the light reflecting plane of the light transmission portion as a starting point.

Regarding claims 59,60,92 and 93 prior art fails to teach or suggest a switch as set forth in claims 48 and 61, respectively wherein the optical path changing portion has a light reflector for diffusely reflecting light or a light scattering body for scattering light.

Regarding claim 63, prior art fails to teach or suggest a multichannel optical switch as set forth in claims 61 and 62, wherein each light transmission channel in a plurality of optical switches is crossed to each other and shares a part of each light transmission channel.

Regarding claims 70-72, prior art fails to teach or suggest a plurality of the multichannel optical switches according to claims 64-66; wherein each multichannel optical switch is arranged by locating at least one part of output ends of each light transmission channel in the switch in an arc condition with an input end in an outer light transmission channel, which is disposed separately from each multichannel optical switch, at a center.

Regarding claim 94, prior art fails to teach or suggest a switch as set forth in claim 61, wherein at least two kinds of specular reflection angles are shared among the optical path-changing portions.

Conclusion

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

The following US Patents and Publication disclose optical switches using a similar method to change how an input beam is reflected: 5909301, 3514183, 3520595,

Art Unit: 2874

20020105709, 5917641, 3649105, 5875271, 5841916, 5647033, 6438284, 6438283,
6356678, 6236778

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Scott A Knauss whose telephone number is (703) 305-5043. The examiner can normally be reached on 9-5 Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Rodney Bovernick can be reached on (703) 308 - 4819. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9318.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0530.

Scott Knauss

Art Unit 2874

sak


HEMANG SANGHAVI
PRIMARY EXAMINER